

Application No. 10/565,598  
Reply dated September 17, 2010  
Reply to Office Action of June 17, 2010

**REMARKS**

**Reconsideration And Allowance  
Are Respectfully Requested.**

Claims 1-4, 7-9, 23 and 24 are currently pending. No claims have been amended. Claims 5, 6, 10-22 and 25 were previously canceled. No claims have been added. No new matter has been added. Reconsideration is respectfully requested.

With regard to the outstanding rejections, claim 1 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,061,027 to Legay ("Legay '027") in view of U.S. Patent Application Publication No. 2003/0142036 to Wilhelm ("Wilhelm"). Claims 1-4 and 7-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,927,729 to Legay ("Legay '729") in view of Wilhelm. Claims 1-3 and 7-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over "High-Directivity Patch Antenna with Both Photonic Bandgap Substrate and Photonic Bandgap Cover" to Qiu et al. ("Qiu") in view of Wilhelm. Claims 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Qiu in view of Wilhelm and U.S. Patent Application Publication No. 2003/0052834 to Sievenpiper et al. ("Sievenpiper"). Claims 23 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Legay '729 in view of Wilhelm and U.S. Patent No. 6,850,205 to

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Yamamoto et al. ("Yamamoto"). These rejections are respectfully traversed in view of the remarks which follow.

Fundamentally, all of the rejections being asserted against claim 1 rely on the proposition that "Wilhelm teaches the size, shape and periodicity of PBG elements all contribute to the materials operational frequency and bandwidth" and the subsequent conclusion that this implies that it would be obvious for the skilled person to adjust the distance between the conductors in a reactive surface in Legay '027, Legay, '729 and/or Qiu, so that the displacement between conductors is no more than  $1/10$  of the wavelength of the electromagnetic radiation emitted by the structure. This modification is fundamentally flawed. The base references of Legay '027, Legay '729 and Qiu cannot be modified to read upon the claimed invention despite the disclosures of Wilhelm. Unfortunately, this contention is contrary to the fundamental misunderstanding of the prior art.

As the Examiner accepts, unlike the present invention, the prior art relies on photonic band gap (PBG) structures. The Examiner is correct to state that varying the size and shape of photonic band gap elements affects the operational frequency (see, for example Paragraph 59 of Wilhelm: "In general, the size, shape and periodicity of PBG elements all contribute to the material's operational frequency and bandwidth"). Nevertheless, the contrast between the approach taken by the present invention and structures which employ photonic band gaps as

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disclosed by Legay '027, Legay '729 and Qiu, is in fact amply demonstrated by the requirement of claim 1 that the distance between the conductors is less than  $1/10$  of the wavelength. The present invention employs an entirely different mode of operation to the prior art; merely reducing the distance between elements of the reactive surfaces described in Legay '027, Legay '729 and/or Qiu would not bring these prior art devices within the scope of the present claims.

In particular, as Wilhelm states, altering the distance between elements in photonic band gap structure alters the frequency. The Examiner will of course appreciate that there is direct inverse proportionality between frequency and wavelength. Thus, in practice, reducing the distance between elements of a photonic band gap structure (as disclosed by Legay '027, Legay '729 and Qiu) as proposed as being obvious in the outstanding Office Action will increase the operational frequency and thereby decrease the operational wavelength. No matter how small this distance is, the operational wavelength will have shrunk similarly. As such, adjusting the distance between elements of the reactive surfaces in Legay '027, Legay '729 and/or Qiu would have no effect on the ratio between the wavelength and the distance between elements of the reactive surface.

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Accordingly, a person of ordinary skill in the art would not reach the features of the present claims by making the adjustment to the prior art as proposed in the outstanding Office Action; that is, adjusting the distance between elements of the reactive surface. This is because the prior art operates in an entirely different manner to the present invention, meaning that features considered essential to the prior art, such as the photonic band gap structure, are technically incompatible with the claimed invention.

In view of the above, it is clear that a person of ordinary skill in the art, starting from any one of Legay '027, Legay '729 and/or Qiu, would not be led by Wilhelm, or any other document relating to photonic band gap structures, to adopt a displacement between conductors in the reactive layer that is less than  $1/10$  of the wavelength. The person of ordinary skill in the art would understand that such a requirement is incompatible with the photonic band gap structures described in these documents. On the other hand, the present invention requires no photonic band gap structure and employs an entirely different mode of operation. In fact, the use of photonic band gap structures is highly undesirable in the present invention. The present invention results from the interaction between a radiating cavity and a periodic structure which has no band gap properties. Band gap properties are not desired because they can have an inhibiting effect, opposite to what is required, on radiation. This mode of operation is not taught or suggested anywhere in the prior art.

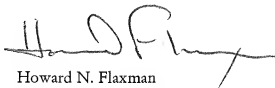
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As the recently issued PTO Guidelines make clear, "Predictability as discussed in *KSR* encompasses the expectation that prior art elements are capable of being combined, as well as the expectation that the combination would have worked for its intended purpose. An inference that a claimed combination would not have been obvious is especially strong where the prior art's teachings undermine the very reason being proffered as to why a person of ordinary skill would have combined the known elements". *DePuy Spine Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314 (Fed. Cir. 2009). Accordingly, we consider it abundantly clear that the invention as claimed in claim 1 is both new and non-obvious over the art cited by the Examiner and respectfully request the outstanding rejections relating thereto be withdrawn. As to those claims dependent upon independent claim 1, they are also believed to overcome the cited references for at least the reasons discussed above.

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It is believed that this case is in condition for allowance and reconsideration thereof and early issuance is respectfully requested. If it is felt that an interview would expedite prosecution of this application, please do not hesitate to contact Applicants' representative at the below number.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'H. N. Flaxman', with a long horizontal flourish extending to the right.

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